

WE CLAIM:

1. A method to aid in detecting the presence of tumor cells in a patient,

comprising:

5 step for determining the presence of a single basepair mutation in a mitochondrial genome of a cell sample of a patient, wherein the mutation is found in a tumor of the patient but not in normal tissue of the patient; and

identifying the patient as having a tumor if one or more single basepair mutations are determined in the mitochondrial genome of the cell sample of the patient.

10 2. The method of claim 1 wherein, prior to the step for determining, the mutation has been identified in a tumor.

3. The method of claim 1 wherein the cell sample is from a tissue suspected of harboring a metastasis.

4. The method of claim 1 wherein the cell sample is from blood.

15 5. The method of claim 1 wherein the cell sample is from urine.

6. The method of claim 1 wherein the cell sample is from sputum.

7. The method of claim 1 wherein the cell sample is from saliva.

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mutation.

16. The method of claim 1 wherein the single basepair mutation is a homoplasmic mutation.

17. The method of claim 1 wherein the single basepair mutation is a T→C substitution at position 710.

18. The method of claim 1 wherein the single basepair mutation is a T→C substitution at position 1738.

19. The method of claim 1 wherein the single basepair mutation is a T→C substitution at position 3308.

20. The method of claim 1 wherein the single basepair mutation is a G→A substitution at position 8009.

21. The method of claim 1 wherein the single basepair mutation is a G→A substitution at position 14985.

22. The method of claim 1 wherein the single basepair mutation is a T→C substitution at position 15572.

23. The method of claim 1 wherein the single basepair mutation is a G→A substitution at position 9949.

24. The method of claim 1 wherein the single basepair mutation is a T→C substitution at position 10563.

5 25. The method of claim 1 wherein the single basepair mutation is a G→A substitution at position 6264.

26. The method of claim 1 wherein the single basepair mutation is an A insertion at position 12418.

10 27. The method of claim 1 wherein the single basepair mutation is a T→C substitution at position 1967.

28. The method of claim 1 wherein the single basepair mutation is a T→A substitution at position 2299.

29. The method of claim 2 wherein the mutation was identified previously in a tumor of the patient.

15 30. The method of claim 29 wherein the patient has received anti-cancer therapy and the step for determining is performed at least three times to monitor progress

of the anti-cancer therapy.

31. The method of claim 1 further comprising a step for testing a normal tissue of the patient to determine the absence of the mutation.

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